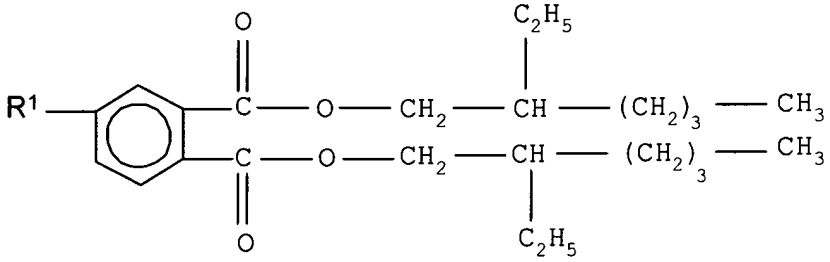
REMARKS

Claim 25 has been corrected to overcome the objection thereto which should now be withdrawn. Claims 5, 6, 13 and 14 have been cancelled.

The rejection of claims 1, 3, 5-7, 9 and 26-28 under 35 USC 103(a) as being unpatentable over Bajer, et al (Synthetic Metals, 1999, 101, 713-714) is respectfully traversed.

The reference from Synthetic Metals, 1999 which the Examiner refers to as "Bajer, et al" discloses the use of di(n-amyl), di(n-decyl), di(butoxy-2-ethyl) and di[2-(butoxy-2-ethoxy)ethyl] esters of 5-sulfoisophthalic acid (wherein the two carboxylic acid groups are in the meta position as shown in the enclosed annex 1) as dopants of polyaniline.

Claims 1 and 26 as amended now relate to compounds wherein R^2 represents a 2-ethylhexyl group, m equals 2 and the sulphonic or phosphonic acid meets the following formula:



or where R^2 represents the group of formula II which is clearly distinct from that taught in Bajer et al. The only structural similarity between claims 1 and 26 and the diesters disclosed by Bajer, et al are the 2-ethylhexyldiesters of 4-sulpho- and 4-phosphophthalic acid which do not meet the requirement for R^2 with the formula as recited in claims 1 and 26 as amended and with m equal to 2. Moreover, the electrical conductivity of polyaniline films doped with these diesters is of the order of 100 S/cm for a molar ratio of diester/Pani of 0.5 (see page 18, lines 1-4 of the instant

application), whereas the electrical conductivity of polyaniline films doped with the diesters of 5-sulfoisophthalic acid as disclosed by Bajer, et al is of 3.10^{-3} S/cm for the same molar ratio diester/Pani (see page 714, right column, last section of "*Results and Discussion*", of Bajer, et al).

The elongation to fracture of polyaniline films doped with the claimed diesters is higher by a factor of over 10 than the elongation to fracture of polyaniline films doped with camphorsulfonic acid as disclosed by Bajer (see page 18, lines 19-22, and Figure 2 of the instant application).

Furthermore, applicant has attached "Annex 1" to indicate the electrical conductivity of polyaniline films doped with diesters of 4-sulfophthalic acid and a graph of the thermal stability of the polyaniline film doped with the diesters of 4-sulfophthalic acid. From the thermal stability graph as shown in Annex 1 in which the polyaniline films were doped with the various diesters of 4-sulfophthalic acid as set forth in claim 28 with a molar ratio diester/Pani of 0.5 and with these tests carried out isothermally at 135°C and at ambient conditions (laboratory air), it is shown that the polyaniline films doped with 2-ethylhexyldiester of 4-sulfophthalic acid (abbreviated Pani/DEHEPSA in Annex 1) is much higher than the one of polyaniline films doped with camphorsulfonic acid (abbreviated Pani/CSA in Annex 1). The conductivity drop was measured in a conuous way as a function of heating time simultaneously for six samples of the same film. The conductivity was measured with a 4-probe technique through a special setup guided by a computer.

Thus, not only do the 2-ethylhexyl diesters of 4-sulfo- and 4-phosphophthalic acids of claims 1 and 26 give polyaniline films having an electrical conductivity much higher than any one of the polyaniline films doped with the diesters disclosed by Bajer, et al but they also prove that polyaniline films have mechanical properties and a thermal stability much higher than the polyaniline films doped with the dopant camphorsulfonic acid taught in Bajer, et al.

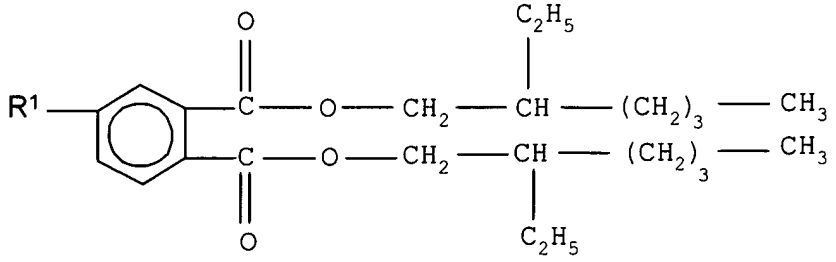
Accordingly, the composition of claims 1 and 26 is clearly not obvious from the teaching in Bajer, et al. In fact, one would not be expected to achieve the properties

in electrical conductivity taught in the subject invention from the diesters taught by Bajer, et al. In view of the above, the rejection of claims 1 and 26 as being obvious in view of Bajer, et al should be withdrawn. Claims 5 and 6 have been cancelled and claims 3, 7 and 9 are dependent upon claim 1, and claim 27 is dependent upon claim 26. Accordingly, claims 3, 7, 9 and 27 are believed to be patentable for the same reasons as given above.

Although claim 28 is an independent claim, it relates only to diesters of 4-sulfophthalic acid of the formula specified in claim 28 and not to esters of 5-sulfoisophthalic acid. A comparison is shown in Annex 1 attached hereto in which the two carboxylic acid groups are in ortho position. This is not disclosed or suggested in Bajer, et al nor does the Examiner make reference to this. Furthermore, as shown in Annex 1, the results of thermal stability tests carried out on polyaniline films doped with various diesters of 4-sulfophthalic acid as defined in claim 28 result in an electrical conductivity much higher than any polyaniline film doped with the diesters disclosed by Bajer, et al and provide a thermal stability much higher than any one of the polyaniline films as disclosed by Bajer, et al.

The rejection of claims 2, 4, 8 and 10-28 under 35 USC 103(a) based upon the teaching of Bajer, et al as applied to claim 1 in combination with Kirmanen, et al (U.S. Patent 5,585,040) or Ikkala, et al (U.S. Patent 5,783,111) or Wang-Cheung (U.S. Patent 5,908,898) is respectfully traversed.

Claim 2 has been amended similar to claim 1, limiting R^2 to a 2-ethylhexyl group and with m equal to 2 such that the sulphonic or phosphonic acid meets the following formula:



In such case the composition is clearly structurally different from Bajer, et al for the same reasons as given heretofore, relative to the rejection of claim 1.

In amended claims 1 and 2, the 2-ethylhexyl sulfo- and phosphobenzoates and the 2-ethylhexyl diesters of 5-sulfo- and 5-phosphoisophthalic acids have been deleted. In addition, the Annex 1 has been provided to show the results of thermal stability tests carried out on polyaniline films doped with various diesters of 4-sulfophthalic acid as defined in claim 28 with a molar ratio diester/PANI of 0.5 to show that the 2-ethylhexyl diesters of 4-sulfo- and 4-phosphothalic acids of claims 1, 2 and 26 give polyaniline films an electrical conductivity much higher than any one of the polyaniline films doped with the diesters disclosed by Bajer, et al and provide mechanical and thermal stability properties to the composition much higher than the polyaniline films doped with the reference dopant in Bajer, et al. None of the other cited references Kirmanen, et al '040 or Ikkala, et al '111 or Wang-Cheung et al '898 teach or suggest the use of 2-ethylhexyl diesters of 4-sulfo- or 4-phosphthalic acids as dopants.

For all of the above reasons, claim 2 is clearly patentable over Bajer, et al taken alone or in combination with any of the references cited by the Examiner. Claims 4, 8, 10, 11 and 15-25 are dependent claims which depend from either claims 1 or 2 and are therefore patentable for the same reasons as given heretofore. Claims 13 and 14 have been cancelled.

Reconsideration and allowance of claims 1-4, 7-12 and 15-28 is respectfully solicited.

Respectfully submitted,

Eugene Lieberstein
Reg. No. 24,645

ANDERSON, KILL & OLICK
1251 Avenue of the Americas
New York, New York 10020-1182
(212) 278-1000

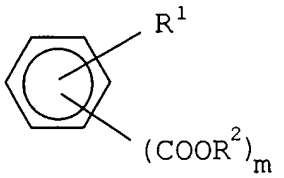
MAILING CERTIFICATE

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as first class mail in an envelope addressed: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on August 1, 2005.

Date: August 1, 2005

Listing of Claims:

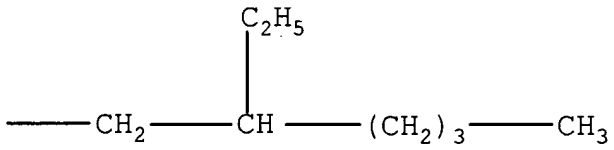
Claim 1. (Currently Amended) Composition for the manufacture of polyaniline films, made up of a solution, in an organic solvent, of a polyaniline in base emaraldine form and of a dopant formed of a sulphonic or phosphonic acid, having the formula:



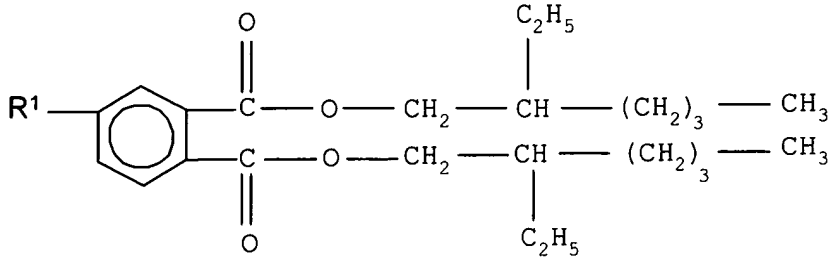
(I)

in which:

- R^1 represents $-SO_3H$ or $-PO_3H_2$
- R^2 represents:



and m equals ~~1 or 2, or~~ 2, in which case said sulphonic or phosphonic acid meets the formula:



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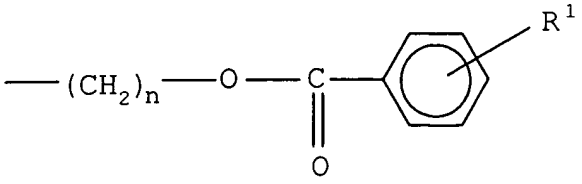
or

– R^2 is a group having the formula:

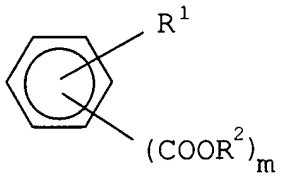


(II)

in which R^1 represents $-SO_3H$ or $-PO_3H_2$, n is a whole number ranging from 1 to 16, and m equals 1.

Claim 2. (Currently Amended) Composition for the manufacture of a conductor composite material containing:

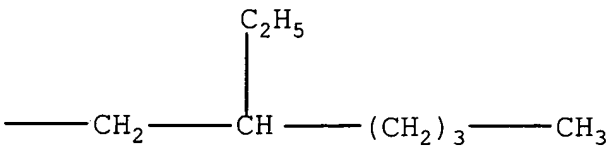
- an organic solvent,
- a polyaniline in base emeraldine form,
- a doping agent formed of a sulphonic or phosphonic acid, meeting the formula:



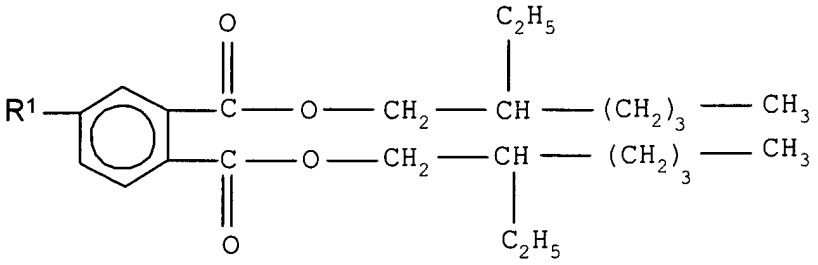
(I)

in which:

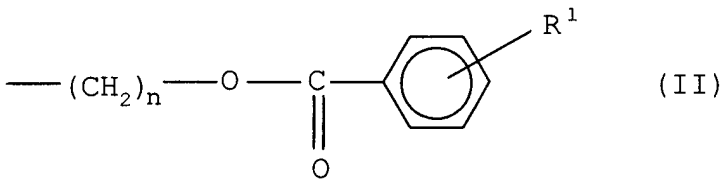
- R^1 represents $-SO_3H$ or $-PO_3H_2$,
- R^2 represents:



and m equals ~~1 or 2, or~~ 2, in which case said sulphonic or phosphonic meets the formula:



- R^2 is a group having the formula:

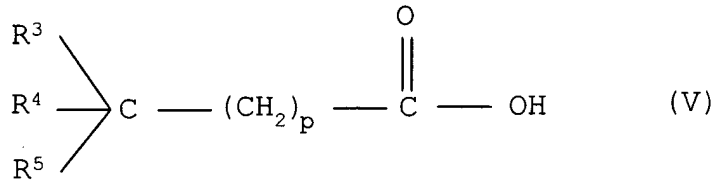


(II)

in which R^1 represents $-SO_3H$ or $-PO_3H_2$, n is a whole number ranging from 1 to 16, and m equals 1,

- an insulating polymer, and
- a plasticizer for the insulating polymer.

Claim 3. (Previously Presented) Composition according to claim 1, in which the solvent is a halogenated derivative of a carboxylic acid having the formula:



(V)

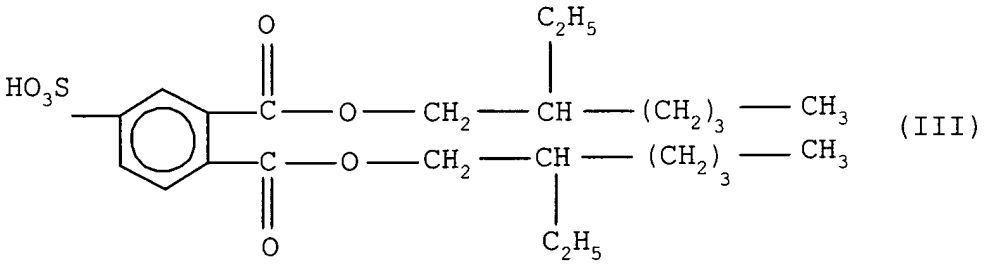
In which R^3, R^4 and R^5, which are identical or different, represent H or a halogen atom chosen from among F, Cl and Br, at least one of R^3, R^4 and R^5 representing a halogen atom, and p equals 0, 1 or 2.

Claim 4. (Original) Composition according to claim 3, in which the solvent is chosen from among dichloroacetic, trifluoroacetic, difluoroacetic, chlorodifluoroacetic, 2-chloropropionic, 2-bromobutyric and 2, 2-dichloro-proprionic acids.

Claim 5. (Cancelled)

Claim 6. (Cancelled)

Claim 7. (Original) Composition according to claim 1, in which the sulphonic acid meets the formula:



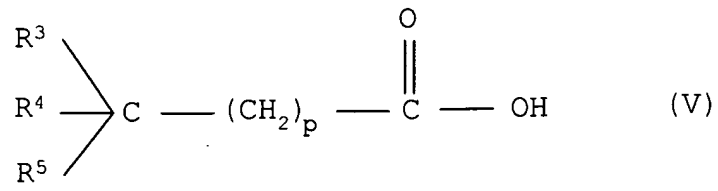
(III)

Claim 8. (Original) Composition according to claim 7, in which the solvent is dichloro-acetic acid.

Claim 9. (Original) Composition according to claim 1, in which the polyaniline and doping agent contents in the solution are such that the molar ratio of the doping agent to the polyaniline in base emeraldine form lies within the range of 0.4 to 0.6.

Claim 10. (Original) Composition according to claim 1, in which the polyaniline content of the solution is 0.1 to 1% by weight.

Claim 11. (Previously Presented) Composition according to claim 2, in which the solvent is a halogenated derivative of a carboxylic acid having the formula:



(V)

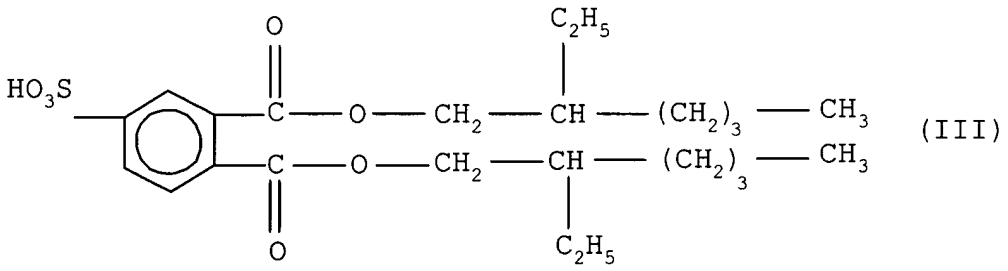
In which R^3, R^4, and R^5, which are identical or different, represent H or a halogen atom chosen from among F, Cl and Br, at least one of R^3, R^4, and R^5 representing a halogen atom, and p equals 0, 1 or 2.

Claim 12. (Original) Composition according to claim 11, in which the solvent is chosen from among dichloroacetic, trifluoroacetic, diflouroacetic, chlorodifluoroacetic, 2-chloropropionic, 2-bromobutyric and 2,2-dichloro-proprionic acids.

Claim 13. (Cancelled)

Claim 14. (Cancelled)

Claim 15. (Original) Composition according to claim 2, in which the sulphonic acid meets the formula:



(III)

Claim 16. (Original) Composition according to claim 15, in which the solvent is dichloro-acetic acid.

Claim 17. (Original) Composition according to claim 2, in which the polyaniline and doping agent contents in the solution are such that the molar ratio of the doping agent to the polyamine in base emeraldine form lies within the range of 0.4 to 0.6.

Claim 18. (Original) Composition according to claim 2, in which the polyamine content of the solution is 0.1 to 1% by weight.

Claim 19. (Original) Composition according to claim 2, in which the insulating polymer is chosen from among polystyrene, polymethylmethacrylate, cellulose polymers, polyvinylchloride, polycarbonates, polyesters and polyurethanes.

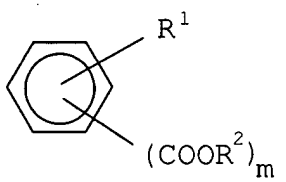
Claim 20. (Previously Presented) Composition according to claim 2, in which the plasticizer is chosen from among the diesters of phthalic acids, the diesters of phtalic acids, the diesters of dicarboxylic acids and the triesters of phosphoric acid.

Claim 21. (Original) Method for manufacturing a conductor composite material containing a polyaniline, characterized in that it comprises the following steps:

- preparing a composition according to claim 2, and
- forming the conductor composite material from said composition by evaporation of the solvent.

Claim 22. (Original) Method according to claim 21, characterized in that the composition is prepared by mixing a first solution of polyaniline and dopant in the solvent with a second solution in the same solvent of the insulating polymer and of the plasticizer.

Claim 23. (Currently Amended) Electricity conductive composite material containing a matrix of insulating polymer in which a conductor polyaniline is distributed doped with a sulphonic or phosphonic acid, meeting the formula:

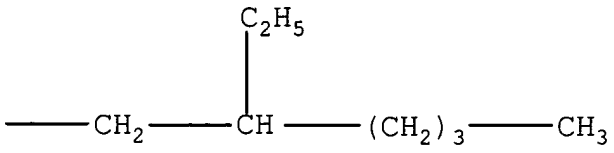


(I)

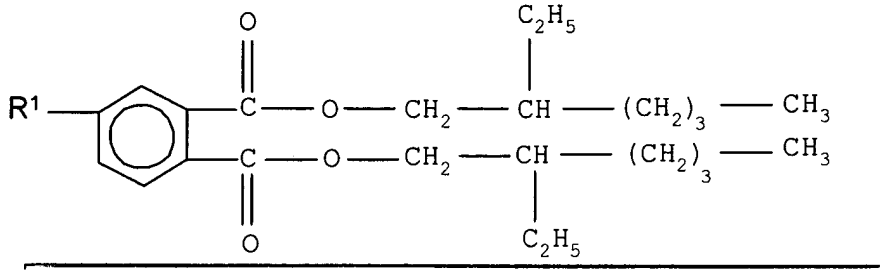
in which:

- R^1 represents $-SO_3H$ or PO_3H_2,

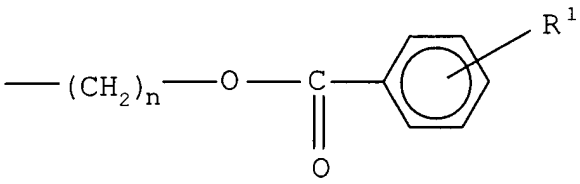
- R^2 represents:



and m equals ~~1 or 2, or~~ 2, in which case said sulphonic or phosphonic acid meets the formula:



- R^2 is a group having the formula:



(II)

in which R^1 represents $-SO_3H$ or PO_3H_2, n is a whole number ranging from 1 to 16, and m equals 1, and a plasticizer for the insulating polymer.

Claim 24. (Original) Composite material according to claim 23, in which the insulating polymer is polymethylmethacrylate.

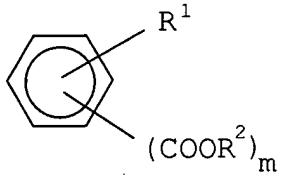
Claim 25. (Currently Amended) Composite material according to claim 23, which contains:

a) 0.06 to 10% by weight polyaniline and dopant,

b) ~~545~~ 55 to 99.9% by weight insulating polymer, and

c) up to 44.94% by weight of plasticizer for the insulating polymer.

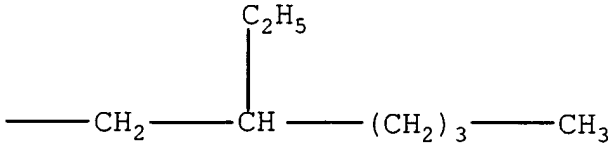
Claim 26. (Currently Amended) Polyaniline film, doped with a suplphonic or phosphonic acid, meeting the formula:



(I)

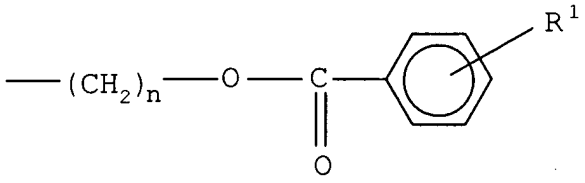
In which:

- R^1 represents $-SO_3H$ or PO_3H_2,
- R^2 represents:



and m equals 1 or 2, or

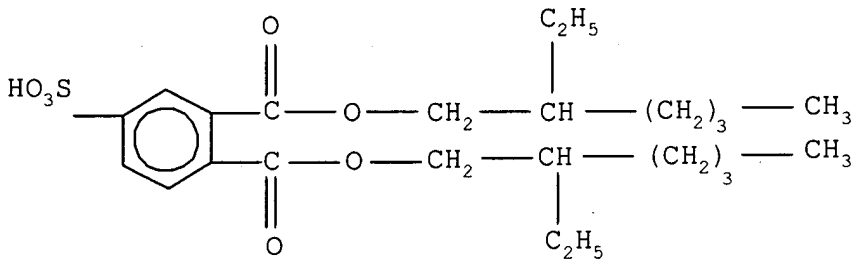
- R^2 is a group having the formula:



(II)

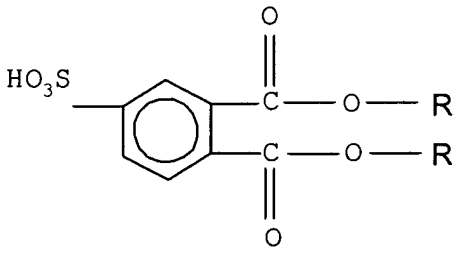
in which R^1 represents $-SO_3H$ or PO_3H_2, n is a whole number ranging from 1 to 16, and m equals 1[[,]].

Claim 27. (Original) Polyaniline film according to claim 26, doped with sulphonic acid having the formula:



(III)

Claim 28. (Previously Presented) Composition for the manufacture of polyaniline films, made up of a solution, in an organic solvent, of a polyaniline in base emeraldine form and of a dopant formed of a diester of 4-sulfophthalic acid, having the formula:



in which:

-R represents a group selected among the n-pentyl, n-octyl, n-decyl, n-dodecyl, 2-ethylhexyl, butoxyethyl and butoxyethoxyethyl groups.

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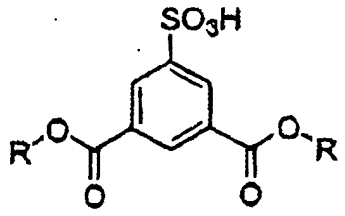
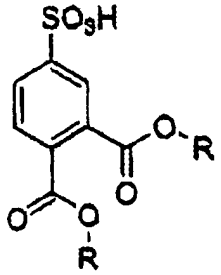
ANNEX 1



Diesters of 5-sulfoisophthalic acid

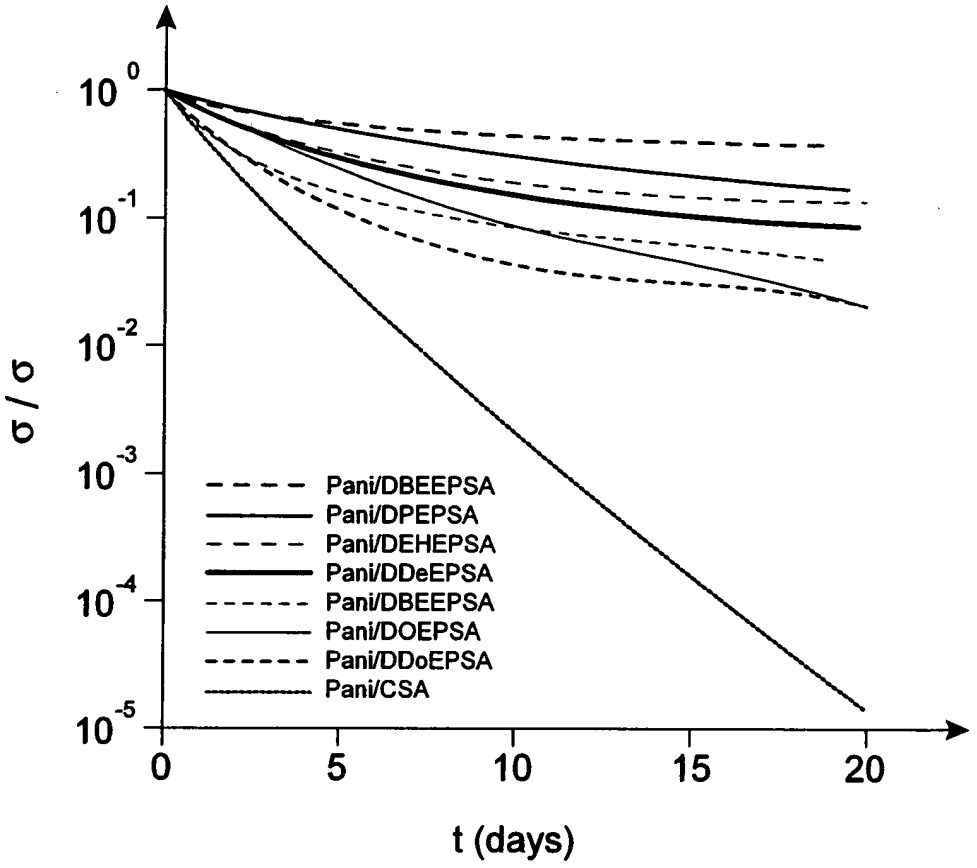


Diesters of 4-sulfophthalic acid

ELECTRICAL CONDUCTIVITY OF POLYANILINE FILMS DOPED WITH DIESTERS OF 4-SULFOPHTHALIC ACID (molar ratio diester/Pani = 0.5)

Pani/butoxyethyl diester of 4-sulfophthalic acid:	172 S/cm
Pani/*n*-pentyl diester of 4-sulfophthalic acid:	138 S/cm
Pani/2-ethylhexyl diester of 4-sulfophthalic acid:	100 S/cm
Pani/*n*-decyl diester of 4-sulfophthalic acid:	59 S/cm
Pani/butoxyethoxyethyl diester of 4-sulfophthalic acid:	97 S/cm
Pani/*n*-octyl diester of 4-sulfophthalic acid:	100 S/cm
Pani/*n*-dodecyl diester of 4-sulfophthalic acid:	79 S/cm

THERMAL STABILITY OF POLYANILINE FILMS DOPED WITH DIESTERS OF 4-SULFOPHTHALIC ACID (molar ratio diester/Pani = 0.5)



DBEEPSA: butoxyethyl diester of 4-sulfophthalic acid

DPEPSA: *n*-pentyl diester of 4-sulfophthalic acid

DEHEPSA: 2-ethylhexyl diester of 4-sulfophthalic acid

DDeEPSA: *n*-decyl diester of 4-sulfophthalic acid

DBEEEPSA: butoxyethoxyethyl diester of 4-sulfophthalic acid

DOEPSA: *n*-octyl diester of 4-sulfophthalic acid

DDoEPSA: *n*-dodecyl diester of 4-sulfophthalic acid

CSA: camphorsulfonic acid